# When Do the Costs Cross?

Grade 9 | Mathematics | Assessment | 40 minutes

## Learning target

Compare linear cost functions and interpret their intersection in context.

## Prerequisites and materials

Substitute into expressions; solve a linear equation. Provide pages 2-3, pencil, and a calculator if needed. These are paper-based analyses of fictional data; no physical experiment is required.

## Teaching sequence

5 min: Clarify directions and permitted references.

25 min: Learners respond independently with the reference page.

10 min: Collect work, then review reasoning and misconceptions.

## Assessment and access

12 points: 3 per response. Keep calculations, units, and reasoning visible. Allow oral rehearsal, annotate variables, and supply a calculator or worked example with different values during practice. For assessment, clarify directions without giving answers.

## Extension

Explain which plan is cheaper below and above the crossover, using the rates and fixed costs.

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PREVIEW - first two pages only. Full package includes responses and answer key.

# Lesson reference

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Two fictional school-event rental plans charge model credits for x chairs, where x is a nonnegative whole number. Ignore taxes, availability, and other fees in this classroom model.

| Vocabulary | Meaning |
|---|---|
| fixed cost | A charge that does not depend on quantity. |
| rate | The cost added per unit. |
| intersection | An input-output pair where two models agree. |

## Reference data

| Plan | Cost model | Meaning |
|---|---|---|
| A | A(x) = 30 + 4x | 30 fixed; 4 per chair |
| B | B(x) = 60 + 2x | 60 fixed; 2 per chair |

## Rules and assumptions

To find a crossover, set A(x) = B(x). Interpret both the chair count and cost; do not report the chair count as a price.

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